REMARKS

This amendment is responsive to the Office Action dated August 18, 2006. Applicant has amended claims 1, 10, 32, 35, and 46. Claims 1–58 are pending, with claims 36–45 having been withdrawn.

Restriction Under 35 U.S.C. § 121

In the Office Action, the Examiner restricted claims 1–50 under 35 U.S.C. § 121 as follows:

Group I. Claims 1–35 and 46–50, drawn to electromagnetic antennae with compensating elements, classified in class 340, subclass 572.7, and

Group II. Claims 36–45, drawn to RFID systems, classified in class 340, subclass 572.1.

During a telephonic conversation with the Examiner on August 14, 2006, Applicant provisionally elected Group I with traverse. Applicant affirms this election with traverse.

In the Office Action, the Examiner based the restriction on the reasoning that claims are patentably distinct because the RFID system claims (i.e., Group II) "do not require compensating elements to function properly." This reasoning is, in fact, erroneous in that independent claim 36 specifically requires a compensated RFID tag having a compensating element positioned for electromagnetic coupling to the inductive loop antenna such that the interrogating antenna is able to communicate with the compensated RFID tag even when in the compensated RFID tag is in the presence of the other RFID tags.

Objection to the Drawings

In the Office Action, the Examiner objected to the drawings for failing to comply with 37 C.F.R. 1.84(p)(5) because they do not include the reference signs 12 and 12D mentioned in the descriptions. The appearance of reference numeral "12D" in the specification is a typographical error, and Applicant has amended the specification accordingly at paragraph [0035] to replace "12D" with "18." Applicant has also amended the specification at [0026] to make clear that the term "storage areas 12" refers collectively to open shelf 12A, a cabinet 12B, a vertical file

separator 12C, and not to a separate element within the figures. No new matter has been added by way of these amendments.

Claim Rejection Under 35 U.S.C. § 102

In the Office Action, the Examiner rejected claims 1, 4, 6, 10, 13–15, 19, 21, 26–28 and 30 under 35 U.S.C. 102(e) as being anticipated by Liu et al. (WO 03/096478). Applicant respectfully traverses the rejection to the extent such rejection may be considered applicable to the amended claims. Liu et al. fails to disclose each and every feature of the claimed invention, as required by 35 U.S.C. 102(e), and provides no teaching that would have suggested the desirability of modification to include such features.

Applicant has amended claims 1, 10, and 46 to clarify the structural features of the compensating element. Liu et al. fails to disclose such a compensating element. For example, Liu et al. fails to teach or suggest a compensating element comprising a closed loop of conductive material having a size and proximity to an inductive loop antenna of an RFID tag for electromagnetic coupling to the inductive loop antenna to substantially maintain an operating frequency of the inductive loop antenna at or near an operating frequency of an RFID system in the presence of other RFID tags, as recited by Applicant's claim 1, as amended. Moreover, Liu et al. fails to teach or suggest radio frequency identification (RFID) tag comprising an inductive loop antenna, and a compensating element sized and positioned on the RFID tag proximate the inductive loop antenna for electromagnetic coupling to the inductive loop antenna to substantially maintain an operating frequency of the inductive loop antenna at or near an operating frequency of an RFID system in the presence of other RFID tags, as recited by Applicant's claim 10, as amended. Independent claim 46, as amended, recites similar limitations.

In the Office Action, the Examiner stated that either outer loop 30 or inner parasitic loop 50 of Liu is a compensating element that has a size for electromagnetic coupling to an inductive loop antenna, i.e., feed loop 40. However, neither the outer loop 30 nor the inner parasitic loop 50 of Liu et al. compensates for influences by other tags present within the interrogation field that, but for the compensating element, would shift the operating frequency of the RFID tag.

The compensating element described by the present application is an element that controls or at least influences the resonating frequency of the inductive loop antenna itself to substantially maintain an operating frequency of the inductive loop antenna at or near an operating frequency of an RFID system. For example, as described throughout the specification, the compensating element actually *stabilizes* the resonating frequency of the inductive loop antenna when the antenna of the RFID tag is subjected to other electromagnetic fields that would otherwise modify its resonating frequency. (*See, e.g.*, Specification at paras. [0059]–[0061]). As noted above, this feature is specifically stated in amended claims 1, 10 and 46.

Liu et al. makes no mention tag-to-tag coupling, or preventing frequency shifts caused by tag-to-tag coupling. Moreover, based on the description of the RFID tag of Liu et al., it appears that neither outer loop 30 nor inner parasitic loop 50 of Liu et al. would even be capable of electromagnetically coupling to the central loop 40 to substantially maintain an operating frequency of the central loop 40 at or near an operating frequency of an RFID system in the presence of other RFID tags.

In contrast, the Liu et al. RFID tag is designed for the purpose of **increasing** the band of a single RFID tag. In particular, outer loop 30 and inner parasitic loop 50 are included to **increase** the bandwidth of the antenna significantly without enlarging the size of the antenna. For example, Liu et al. describes that outer loop 30 is designed to resonate at a frequency falling within the lower portion of the antenna band of operation, and has a dominant effect on the antenna characteristics due to its larger aperture size. The function of inner parasitic loop 50 is to alter the impedance of feed loop 40.

To illustrate the structural differences between the Liu et al. antenna and the claimed invention, Liu et al. states at page 4, line 25 that parasitic loop 50 "can also have an effect on the resonant frequency of the feed loop 40, which tends to decrease as the space between the two loops is decreased."[1] In contrast, as described in Applicant's specification, the resonant frequency of the antenna increases as the space between the compensating element and the antenna decreases.[2] This may be due to the different function the parasitic loop 50 of Liu et al. performs with respect to feed loop 40, as compared to the manner in which the compensating

[1] Liu et al. at page 4, ll. 23–27 (emphasis added).
[2] Specification, paragraph [0062], ll. 7–9; para. [0065] (emphasis added).

element 30 is coupled to the tag antenna 24 as described in Applicant's specification. For example, the tag described in Liu et al., each of loops 30, 40, and 50 interacts with the incoming RF energy from the interrogator.[3]

In contrast, as described at paragraph [0067] of the Specification,

> FIGS. 15A and 15B also indicate that the effect of the compensating element 30 is a proximity coupled effect. That is, the compensating element 30 is proximity coupled to the RFID tag antenna 24. The compensating element 30 carries a coupled parasitic current driven by the current in the RFID tag antenna 24. The compensating element 30 is thus electromagnetically coupled to the RFID tag antenna 24 as opposed to the interrogating magnetic field generated by the RFID reader antenna. To produce this proximity coupled effect, the compensating element 30 can be positioned for electromagnetic coupling to the RFID tag antenna, i.e., such that a primary current in the antenna 24 induces a parasitic current in the compensating element 30. (Emphasis added).

As made clear by Liu et al., the structural relationship of the loops 30, 40 and 50 of the antenna cause all of the loops to interact with the RF energy of the interrogator, i.e., the interrogating magnetic field, so as to increase the band of the RFID tag. Consequently, none of the loops could act as compensating elements in any meaningful way so as to stabilize the operating frequency of the RFID tag when in the presence of other tags. As a result, Liu et al. fails to teach or suggest a compensating element comprising a closed loop of conductive material having the structural features of a size and proximity to an inductive loop antenna for electromagnetic coupling to the inductive loop antenna that substantially maintains an operating frequency of the inductive loop antenna at or near an operating frequency of an RFID system in the presence of other RFID tags, as recited by amended claim 1, and similarly fails to teach or suggest the RFID tags of independent claims 10 or 46 as amended.

In order to support an anticipation rejection under 35 U.S.C. 102(e), it is well established that a prior art reference must disclose each and every element of a claim. This well known rule of law is commonly referred to as the "all-elements rule."[4] If a prior art reference fails to disclose any element of a claim, then rejection under 35 U.S.C. 102(e) is improper.[5]

---

[3] See, e.g., Liu et al. at page 4, ll. 13–27.
[4] *See Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 231 USPQ 81 (CAFC 1986) ("it is axiomatic that for prior art to anticipate under 102 it has to meet every element of the claimed invention").
[5] *Id. See also Lewmar Marine, Inc. v. Barient, Inc.* 827 F.2d 744, 3 USPQ2d 1766 (CAFC 1987); *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (CAFC 1990); *C.R. Bard, Inc. v. MP Systems, Inc.*, 157 F.3d 1340, 48 USPQ2d 1225

Of course, the claims dependent on independent claims 1, 10, and 46, i.e., claims 2–9, 11–35, and 47–50, incorporate all of the limitations of the respective base claims, and therefore are patentable for at least the reasons expressed above.

Liu et al. fails to disclose each and every limitation set forth in claims 1, 4, 6, 10, 13–15, 19, 21, 26–28 and 30. For at least these reasons, the Examiner has failed to establish a prima facie case for anticipation of Applicant's claims 1, 4, 6, 10, 13–15, 19, 21, 26–28 and 30 under 35 U.S.C. 102(e). Withdrawal of this rejection is requested.

Claim Rejection Under 35 U.S.C. § 103

In the Office Action, the Examiner rejected claims 2, 3, 11, 12, 18, 20, 22–25, 29 and 31 under 35 U.S.C. 103(a) as being unpatentable over Liu et al. Applicant respectfully traverses the rejection. The applied references fail to disclose or suggest the inventions defined by Applicant's claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed invention.

With regard to claims 2 and 11, the Examiner stated that a parasitic current is an inherent property of the closed loop found in Liu. Although Liu et al. refers to inner loop 50 as a "parasitic loop," Liu et al. provides no teaching or suggestion that a parasitic current is induced in the compensating element in response to the electromagnetic coupling to the inductive loop antenna, as required by claim 2. Similarly, Liu et al. makes no mention that a parasitic current is induced in the compensating element by a primary current in the inductive loop antenna, as required by claim 11. Rather, as described above, Liu et al. indicates that parasitic inner loop 50 may interact directly with the RF field provided by the interrogator. Thus, it would be more consistent with the teachings of Liu to conclude that any current induced in loop 50 is induced by the RF field provided by the interrogator. Consequently, the requirements of claim 2 are not "inherent" in the closed loop of Liu.

In the Office Action, the Examiner stated that the features of claim 3 and 23 have been used in circuitry construction "for many years," and further stated that the features are "an obvious use of the crowded prior art."[6] With respect to claims 20, 22, 24, and 25, the Examiner

---

(CAFC 1998); *Oney v. Ratliff*, 182 F.3d 893, 51 USPQ2d 1697 (CAFC 1999); *Apple Computer, Inc. v. Articulate Systems, Inc.*, 234 F.3d 14, 57 USPQ2d 1057 (CAFC 2000).

[6] Office Action dated August 18, 2006, at pages 6–7.

stated that "the exact location of the loop is a matter best left to the designer or user of the RFID tag to maximize the compensation of the closed loop. As the exact position does not produce a new or unexpected result, this is considered an obvious variant on the prior art."[7]

The Court of Appeals for the Federal Circuit recently addressed the evidentiary standard required to uphold an obviousness rejection.[8] Specifically, the Federal Circuit stated: "[the] factual question of motivation is material to patentability, and (can) not be resolved on subjective belief and unknown authority.[9] This finding must be based upon substantial evidence, and not subjective musings or conjecture by the Examiner.[10] Deficiencies in the evidentiary record cannot be cured by general conclusions such as "general knowledge" or "common sense."[11] Accordingly, the Examiner cannot rely on unsupported, conclusory statements to close holes in the evidentiary record.[12] Unless the Examiner can establish an evidentiary record based on concrete prior art references that establish that it would have been obvious to a person with ordinary skill in the art to incorporate the features of Applicant's dependent claims, the claims should be allowed.

With respect to claim 12, the limitations of claim 12 are not inherent in the RFID system described by Liu et al, as suggested by the Examiner. Claim 12 recites that the compensating element is positioned for electromagnetic coupling to the inductive loop antenna such that an RFID system interrogating antenna is able to detect the compensated RFID tag when in close proximity to other RFID tags. The Examiner stated that "interrogating antenna for RFID systems inherently detect RFID tags, even in close proximity" to other RFID tags, and concluded that such a feature is an inherent property of RFID systems and therefore not a patentable innovation. Applicant respectfully disagrees. As discussed in Applicant's specification at paragraph [0037]:

> Often, a group of articles with RFID tags, such as file folders on a shelf, are located in close proximity in a reader or interrogator of RFID system 10. Conventional RFID tags, including tags tuned for optimum function at the RFID system operating frequency f_0, would tend to show significant interference, i.e., tag-to-tag coupling, when in close proximity to each other. This interference results in an inability to "read" or identify some or all of the individual RFID tags

[7] Office Action dated August 18, 2006, at page 7.
[8] *In re Lee*, 61 USPQ2d 1430, (CAFC 2002).
[9] *Id.* at 1434.
[10] *Id.*
[11] *Id.*
[12] *Id.*

> in the group. As a result, accurate or up to date information as to the location of each individual article tagged with conventional RFID tags may not be obtained. (Emphasis added).

As this passage makes clear, Applicant has identified and proposed a solution to the problem of shifts in resonant frequency when RFID tags are located in close proximity within the interrogation field. This problem has recently been recognized in industry.[13] Contrary to the Examiner's assertion, it is not an inherent property of RFID systems to be capable of detecting an RFID tag when in close proximity to other RFID tags. Moreover, Liu et al. fails to even address the issue of reading RFID tags when in close proximity to other RFID tags, or the tag-to-tag coupling that may result from such proximity. Thus, the features of claim 12 are not inherent to Liu et al., and should be allowable.

With respect to claim 18 and 31, Liu et al. provides no teaching or suggestion that loops 30 and 50 may be electrically connected to loop 40. The Examiner stated that the parasitic loop of Liu "is considered electrically connected" to feed loop. Applicant disagrees with this conclusion. As explained in Applicant's specification, at paragraph [0047]:

> In FIG. 3, the compensating element 30 is electrically connected to antenna 24 via a conductive jumper (short circuit) 32 connecting innermost coil 24A to the compensating element 30 at one point on the perimeter of the compensating element 30. In other words, the compensating element 30 may be in electrical contact with the RFID tag antenna 24 and still perform the compensation function described herein. (Emphasis added).

Applicant's specification further states that "compensating element 30 can be electrically connected or electrically isolated (i.e., not connected) to the RFID antenna 24."[14] As would be clear to one of ordinary skill in the art in view of common usage and Applicant's specification, two elements are "electrically connected" only if a conductive electrical pathway exists between them. It does not follow from the mere fact that the presence of one loop may impact the impedance of another that the two loops are electrically connected. In this case, Liu et al. clearly states that loops 30, 40, and 50 are not electrically connected. For example, Liu et al. repeatedly states that each one of the plurality of loop antennas is "electrically isolated" from each other one

[13] See, e.g., Scher, UsingRFID.com, April 2005, http://www.usingrfid.com/features/read.asp?id=22 (stating that a dense stack of RFID tags placed in an energy field will have the tendency to pull the centre frequency off of 13.56 MHz. If the bandwidth is too narrow any shift in centre frequency may pull the entire response out of the bandpass, rendering communication ineffective.)

[14] Specification at paragraph [0073].

of the loop antennas.[15] As another example, Liu et al. states that "since the coupling between the loops is entirely non-conductive coupling, i.e., reactive coupling, each loop may be positioned on a different layer."[16] Consequently, Liu et al. fails to teach or suggest a compensating loop that is electrically connected to an inductive loop antenna, as recited by claim 11. Liu et al. also fails to teach or suggest a compensating element that comprises at least one loop of an inductive loop antenna electrically connected to at least one other loop of the inductive loop antenna, as recited by claim 31.

In the Office Action, the Examiner rejected claim 5 under 35 U.S.C. 103(a) as being unpatentable over Liu et al. in view of Brady et al. (US 6,285,342). Applicant respectfully traverses the rejection. The applied references fail to disclose or suggest the inventions defined by Applicant's claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed invention.

Claim 5 specifies that the compensating element has a substantially circular shape. The Examiner stated that Liu et al. fail to disclose a circular compensating element, but asserted that incorporation of such a feature would have been obvious in view of Brady et al. Brady et al. provides no teaching sufficient to overcome the basic deficiencies evident in Liu et al. as set forth above with respect to the independent claims. In view of the shortcomings of the Liu et al. reference, it is not necessary to comment in detail on the teachings provided by Brady et al. However, Applicant neither admits nor acquiesces in the propriety of the Examiner's characterizations of Brady et al. or the application of this reference to the claimed invention. Rather, Applicant reserves the right to point out differences between Brady et al. and any aspect of the claimed invention.

In the Office Action, the Examiner rejected claims 7–9 and 29 under 35 U.S.C. 103(a) as being unpatentable over Liu et al. in view of Jesser (US 7,075,435). Applicant respectfully traverses the rejection. The applied references fail to disclose or suggest the inventions defined by Applicant's claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed invention.

[15] Liu et al., Abstract; page 2, ll. 11–12; claim 1
[16] Liu et al., page 9, ll. 22–26 (emphasis added).

Claims 7–9 specify that the compensating element further comprises an adhesive layer. Claim 29 specifies that the RFID tag resonates at a frequency of approximately 13.56 ± 1.0 MHz. The Examiner stated that Liu et al. fails to disclose a compensating element that includes an adhesive layer, but asserted that incorporation of such a feature would have been obvious in view of Jesser. Jesser provides no teaching sufficient to overcome the basic deficiencies evident in Liu et al. as set forth above with respect to the independent claims. In view of the shortcomings of the Liu et al. reference, it is not necessary to comment in detail on the teachings provided by Jesser. However, Applicant neither admits nor acquiesces in the propriety of the Examiner's characterizations of Jesser or the application of this reference to the claimed invention. Rather, Applicant reserves the right to point out differences between Jesser and any aspect of the claimed invention.

In the Office Action, the Examiner rejected claims 46–50 under 35 U.S.C. 103(a) as being unpatentable over Liu et al. (WO 03/096478) in view of Gershenfeld et al. (US 6,724,310). Applicant respectfully traverses the rejection to the extent such rejections may be considered applicable to the claims as amended. The applied references fail to disclose or suggest the inventions defined by Applicant's claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed invention.

Independent claim 46 is patentable for at least the reasons set forth above with respect to claims 1 and 10; namely, that Liu et al. fails to teach or suggest an RFID tag having a compensating element sized and positioned on the RFID tag proximate the inductive loop antenna for electromagnetic coupling to the inductive loop antenna to substantially maintain an operating frequency of the inductive loop antenna at or near an operating frequency of an RFID system in the presence of other RFID tags, as required by claim 46 as amended.

Moreover, Liu et al. provides no teaching or suggestion of an RFID tag for placement on a conductive surface, as recited by claim 46. Claims 46–50 further require a substrate and a dielectric spacer positioned between the substrate and the conductive surface. The Examiner stated that Liu et al. fails to mention a dielectric spacer positioned between the substrate and the conductive surface, but asserted that incorporation of such a feature would have been obvious in view of Gershenfeld et al.

Gershenfeld et al. provides no teaching sufficient to overcome the basic deficiencies evident in Liu et al. as set forth above with respect to the independent claims. In view of the shortcomings of the Liu et al. reference, it is not necessary to comment in detail on the teachings provided by Gershenfeld et al. However, Applicant neither admits nor acquiesces in the propriety of the Examiner's characterizations of Gershenfeld et al. or the application of this reference to the claimed invention. Rather, Applicant reserves the right to point out differences between Gershenfeld et al. and any aspect of the claimed invention.

For at least these reasons, the Examiner has failed to establish a prima facie case for non-patentability of Applicant's claims 2, 3, 5, 7–9, 11, 12, 18, 20, 22–25, 29, 31, and 46–50 under 35 U.S.C. 103(a). Withdrawal of this rejection is requested.

Allowed Claims:

In the Office Action, the Examiner indicated that claims 17 and 32–35 are objected to as being dependent upon a rejected base claim but includes subject matter that would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant has rewritten allowable claim 32 in independent form and has included all subject matter recited by the base claims and any intervening claims. Claims 33–34 depend upon amended claim 32.

Applicant has rewritten allowable claim 35 in independent form and has included all subject matter recited by the base claims and any intervening claims.

Applicant submits that claims 32–35 are in condition for allowance.

RECEIVED
CENTRAL FAX CENTER
NOV 20 2006

New Claims:

Applicant has added claims 52–58 to the pending application. The applied references fail to disclose or suggest the inventions defined by Applicant's new claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed inventions. As one example, the references fail to disclose or suggest a method comprising selecting a size for a compensating element, forming the compensating element according to the selected size, and positioning the compensating element on an RFID tag proximate an inductive loop antenna so as to provide electromagnetic coupling by the compensating element to the inductive loop antenna to substantially maintain an operating frequency of the inductive loop antenna at or near an operating frequency of an RFID system in the presence of other RFID tags, as recited by new claim 55. No new matter has been added by the new claims. For example, support for new independent claim 55 can be found throughout the specification, e.g., at paragraphs [0044]–[0046] and [0067]–[0068].

CONCLUSION

All claims in this application are in condition for allowance. Applicant respectfully requests reconsideration and prompt allowance of all pending claims. Please charge any additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed attorney to discuss this application.

Date: November 20, 2006

By: Kent J. Sieffert

SHUMAKER & SIEFFERT, P.A.
8425 Seasons Parkway, Suite 105
St. Paul, Minnesota 55125
Telephone: 651.735.1100
Facsimile: 651.735.1102

Name: Kent J. Sieffert
Reg. No.: 41,312